

REMARKS

Claims 1-18 and 22 are pending and claims 1-18 and 22 stand rejected.

Claim Rejections Under 35 USC § 103

Claims 1-17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 7,065,236 by Marcelpoil et al. ("Marcelpoil") in view of U.S. Patent 4,090,243 by Kotera et al. ("Kotera").

Regarding claims 1 and 10, the Examiner asserts that Marcelpoil discloses a method/program for quantifying color in a sample comprising multiple colors. It is understood that the Examiner has set forth limitations of the rejected base claims along with corresponding portions of the Marcelpoil specification in parentheses as follows:

"measuring a color channel value in a plurality of pixels from a control sample comprising a single color of interest (column 8/14-23: camera 300 captures a color image of a sample 500 - the image having red, green, and blue color channel values);

defining a vector for the control sample, wherein the vector comprises a color channel value present in the control (e.g. the optical density vector OD, given by equations 3-5 or 6-8 in column 11, defines a vector comprising the measured optical densities for the red, green, and blue color channels);

defining a matrix comprising each of the values of each of the color channels (i.e. the matrix formed by the equations associated with the OD vector is defined by equations 21 and 22 in column 14, in order to determine the dye concentrations C based on the known optical densities OD and absorption coefficients E - see column 14/1-6);

defining a conversion matrix comprising the inverse of the matrix based upon the control measurements (i.e. the conversion matrix denoted by equation 23 in column 14 is defined based upon the measured control optical densities);

measuring color channel values in an image of an experimental sample comprising a plurality of colors of interest, each of the pixels comprising a plurality of color channels (column 16/9-14: an experimental sample having the same dyes uses in the calibration process for determining the conversion matrix is imaged in the same manner as the control sample); and

calculating the amount of a color in the experimental sample by converting the channel values in the experimental sample using the conversion matrix (column 16/14-31 : the amount of color, or concentrations of the dyes, in the experimental sample is determined using the conversion matrix)."

The Examiner also asserted that "Marcelpoil seems to only utilize a single control sample and does not appear to disclose or suggest using a 'plurality of control samples,' as claimed" and that accordingly, "Marcelpoil does not disclose defining the vector or the matrix on the basis of an "average" of color channel values for a 'plurality of control samples.'"

The Examiner combines Marcelpoil with Kotera asserting that Kotera discloses a system (figures 1 A and 1 B) for characterizing the colors of a color sample that is very similar to that of Marcelpoil and involves the same concepts of deriving an inverse matrix of mean color intensity values (column 5/1 -35) and using the inverse matrix to ascertain the colors of an experimental sample (column 5/58-66). Further, the Examiner asserted that the disclosure of Marcelpoil and Kotera are considered related at least in the sense that both are directed to analogous problems in the field of image analysis, and both seek solutions to those problems.

The rejection of claims 1-17 and 22 is respectfully traversed.

To establish a *prima facie* case of obviousness, “the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007), 82 U.S.P.Q.2d 1385 (S.Ct. 2007), citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966). In addition, the Supreme Court noted that the teaching, suggestion or motivation to combine test (TSM) may be helpful in determining obviousness. Considerations of the TSM test include some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; reasonable expectation of success; and the prior art reference (or references, when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP §2142. “There is no necessary inconsistency between the idea underlying the TSM test and the Graham analysis.” *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007), 82 U.S.P.Q.2d 1385 (S.Ct. 2007). In addition, “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007), 82 U.S.P.Q.2d 1385 (S.Ct. 2007), citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

The references, Marcelpoil and Kotera, do not teach or suggest all the claim limitations of independent claims 1 and 10. For example, the Examiner noted that Marcelpoil seems only to utilize a single control sample and does not appear to disclose or suggest using a “plurality of control samples”. However, Kotera also does not disclose employing a “plurality of control samples comprising a single color of interest”. Kotera discloses a print painted with “n” *different* colors C_1, C_2, \dots, C_n by artisans. Each color, C_i , possesses a set of mean values such as $\mu_1^{(0)}, \mu_2^{(0)}, \dots, \mu_r^{(0)}$. However, there is only one control sample for a color of interest; there is only one color sample for each color of interest attached to the print. Independent claims 1 and 10 require a “plurality of control samples comprising a single color of interest.” (page 54, [0090]). Hence, the combination of Marcelpoil and Kotera does not teach or suggest all the claim limitations of independent claims 1 and 10, therefore claim 1 and claim 10 are non-obvious. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Claims 2-17 and 22 depend from independent claim 1 or from independent claim 10 and, therefore, are also nonobvious. Therefore, reconsideration and withdrawal of the rejection of claims 1-17 and 22 under 35 U.S.C. 103(a) are respectfully requested.

Further, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings. The cited references, Marcelpoil and Kotera, disclose distinct methodologies and obtain different results. Kotera discloses use of a statistical approach to compare the probability of a color that appears somewhere in the entire print, appearing in a particular portion of the print. Kotera discloses a method of detecting a color sample that maximizes the joint probability (the

probability of occurrence of each color as the print is scanned across its surface; and the probability that an observed color spectral component corresponds to a particular color sample) using statistical data collected from an elemental area of the print and a large area encompassing a plurality of such elemental areas. Further, Kotera is directed to a method and apparatus for separating colors of a print in which probability and statistical data handling techniques are used to recognize colors with a *high degree of certainty*. (Abstract, Col. 1, lines 30-42; Col. 2, lines 39-45). Marcelpoil discloses a method of determining an amount of at least one molecular specie comprising a sample, each molecular specie being indicated by a dye. An optical density of the sample is determined in each of a red, green, and blue channel at a particular pixel in the image. The calculated matrix comprises the amount of each molecular specie, as indicated by the respective dye, for that pixel. Marcelpoil does not utilize probabilities, but instead, determines the amount of the molecular specie (not the probability of an amount), and is pixel specific.

Therefore, for at least the reasons provided above, the combination of Marcelpoil and Kotera does not render claims 1-17 and 22 obvious. Reconsideration of the rejection of claims 1-17 and 22 is respectfully requested.

Claim Rejections Under 35 USC § 103

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 7,065,236 by Marcelpoil et al. ("Marcelpoil") in view of U.S. Patent 4,090,243 by Kotera et al. ("Kotera") and U.S. Patent Application Publication 2004101 14227 by Henderson et al. ("Henderson").

The Examiner asserted that Marcepoil discloses a machine vision system (figures 1 and 2) for automated analysis of a biological sample on a slide. It is understood that the Examiner has set forth limitations of the rejected claim along with corresponding portions of the Marcepoil specification in parentheses as follows:

a system processor (i.e. computer 350 includes a processor);

a computer program on computer readable medium (column 2012-14), the computer program comprising an image algorithm comprising instructions to cause the computer to:

measure a color channel value in a plurality of pixels from a control sample comprising a single color of interest (column 8/14-23: camera 300 captures a color image of a sample 500 - the image having red, green, and blue color channel values);

define a vector for the control sample, wherein the vector comprises a color channel value present in the control (e.g. the optical density vector OD, given by equations 3-5 or 6-8 in column 11, defines a vector comprising the measured optical densities for the red, green, and blue color channels);

define a matrix comprising each of the values of each of the color channels (i.e. the matrix formed by the equations associated with the OD vector is defined by equations 21 and 22 in column 14, in order to determine the dye concentrations C based on the known optical densities OD and absorption coefficients E - see column 1411-6);

define a conversion matrix comprising the inverse of the matrix based upon the control measurements (i.e. the conversion matrix denoted by equation 23 in column 14 is defined based upon the measured control optical densities);

measure color channel values in an image of an experimental sample comprising a plurality of colors of interest, each of the pixels comprising a plurality of color channels (column 16/9-14: an experimental sample having the same dyes uses in the calibration process for determining the conversion matrix is imaged in the same manner as the control sample); and

calculate the amount of a color in the experimental sample by converting the channel values in the experimental sample using the conversion matrix (column 16/14-31: the amount of color, or concentrations of the dyes, in the experimental sample is determined using the conversion matrix); and

output the amount of color in the experimental sample (column 17/1-19);

a monitor in operable communication with the computer (as shown in figure 1);

an input device in connection with the computer (e.g. keyboard or mouse shown in figure 2);

an optical imaging system (video microscopy system 100) in operable communication with the computer, comprising:

a movable stage (column 18/59-63);

an identification member (column 17/28-45: identification marks produced by an operator);

an optical sensing member (camera 300) in optical communication with the stage configured to acquire an image at a location on a slide and in electrical communication with the processor;

a storage member for storing the location of a candidate object or area of interest (column 17/20-64 and column 19/28-46: the memory of the computer 350 is used to store images containing markings that indicate the locations of areas of interest); and
a storage device for storing each image (column 19/22-32).

The rejection is respectfully traversed.

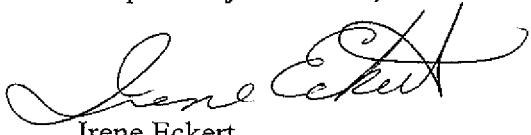
The cited references of Marcepoil, Kotera and Henderson do not teach or suggest all the claim limitations of independent claim 18. As noted above, neither Marcepoil nor Kotera discloses measuring a color channel value in a plurality of pixels from a “plurality of control samples comprising a single color of interest.” Hence, the combination of Marcepoil and Kotera does not teach all of the elements of independent claim 18. Further, Henderson is cited for disclosing an automated slide loader for use with a microscope. However, Henderson does make-up for the deficiencies of the combination of Marcepoil and Kotera. Therefore, the combination of Marcepoil, Kotera and Henderson still does not disclose all the elements of claim 18. Thus, claim 18 is non-obvious over Marcepoil in view of Kotera and Henderson. Further, as noted above with Marcepoil and Kotera, there is no suggestion or motivation in the references themselves to combine reference teachings and there is no reasonable expectation of success. The addition of the Henderson reference does not provide a suggestion or motivation to combine the reference teachings. For at least the above reasons, independent claim 18 is non-obvious. Reconsideration and withdrawal of the rejection of claim 18 over Marcepoil in view of Kotera and Henderson are respectfully requested.

Conclusion

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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